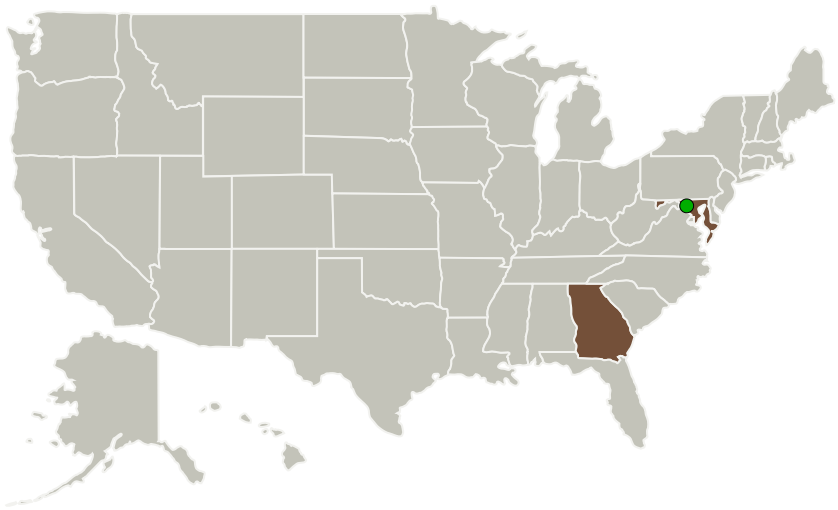
# Electrionically Steered Antenna for Advanced RF Communications, Phase I

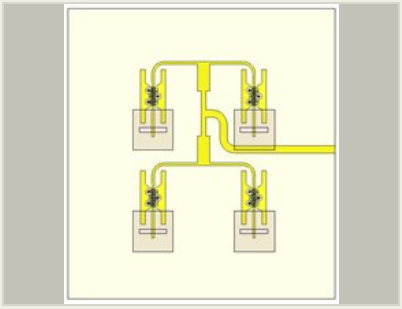
Completed Technology Project (2017 - 2017)

## Project Introduction

Future robotic and human space exploration vehicles will be producing large quantities of data that needs transmitted between vehicles and to the ground stations. However, these vehicles will be tightly constrained in size, weight, and power sources. Traditional methods of using single function elements will not be able to meet these requirements. Therefore, advanced technologies that utilize state-of-the-art materials, packaging, and devices and components are urgently needed to minimize the size, weight, and power usage of the RF communication systems. nGimat proposes to develop high performance Ka-band electrically steered antenna with phased array architectures using nGimat's proprietary BST based tunable dielectric materials. BST's unique voltage tunable characteristics make them promising candidates for critical microwave components in phased array communications and radar systems such as varactors, tunable filters, and phase shifters. The ability to efficiently change the RF complex impedance with low electrical loss could significantly impact future communication systems for both government and civilian applications. Successful maturation of tunable materials together with associated microwave and component circuit design techniques resulting from this effort could reduce the cost while simultaneously improving the performance of future RF communication systems. The resultant antenna will be capable of simultaneous full-duplex multiple beam operations.

## Primary U.S. Work Locations and Key Partners





Electrionically Steered Antenna for Advanced RF Communications, Phase I Briefing Chart Image

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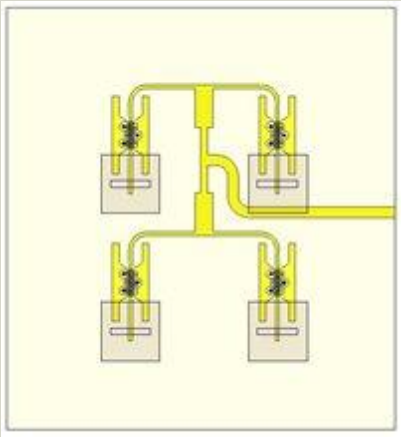
| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| nGimat Co. | Lead Organization | Industry | Norcross, Georgia |
| Goddard Space Flight Center(GSFC) | Supporting Organization | NASA Center | Greenbelt, Maryland |

| Primary U.S. Work Locations | |
|---|---|
| Georgia | Maryland |

## Images



**Briefing Chart Image**
Electrionically Steered Antenna for Advanced RF Communications, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/129402)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
nGimat Co.

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

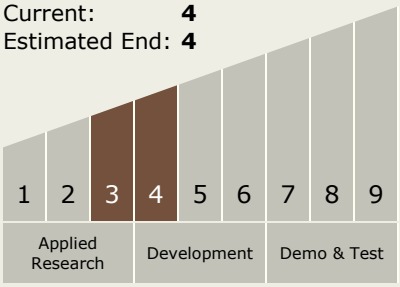
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Yongdong Jiang

## Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.4 Flight and Ground Systems

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System